

Name of research institute or organization:

**Centre Hospitalier Universitaire Vaudois, Lausanne;
Inselspital, Bern**

Title of project:

Fetal programming of hypoxic pulmonary hypertension

Project leader and team:

Urs Scherrer, project leader, Claudio Sartori, Yves Allemann, Hervé Duplain, Stefano Rimoldi, Thomas Stuber, Sophie Garcin, Emrush Rexhaj, Stefano deMarchi, Jonathan Bloch, Susi Kriemler, Nils Staub, Anita Monney, Pierre Dessen, Rolf Vetter

Project description:

Pulmonary hypertension is a syndrome of diverse etiology and pathogenesis. It is characterized by a persistent increase in pulmonary vascular resistance, potentially leading to right heart failure and death. In line with Barker's concept of a fetal programming of adult diseases, recent observations from our group suggest that in humans, pathologic events during the fetal and/or perinatal period predispose the offspring to pulmonary endothelial dysfunction, and, in turn, to exaggerated hypoxic pulmonary hypertension later in life. However, the underlying mechanisms remain unknown.

Therefore, we will study the pulmonary-artery pressure response to hypoxia and its underpinning mechanisms in older children who had suffered from specific pathologic events during their fetal period that may have resulted in fetal programming of pulmonary hypertension. As a side project of this proposal, we will also prospectively study the prevalence of acute mountain sickness (AMS) in children and adults after rapid ascent to 3540 m. AMS is by far the most frequent medical problem encountered at high altitude. Surprisingly, there is no information on its prevalence in children and adolescents at this altitude, and studies in adults on this issue abound with methodological problems.

The high-altitude studies have been completed without any incident. A first article on AMS was published in January 2009 in the world's premier journal of Pediatrics. With regard to the cardiovascular study, during April 2009 we have completed our physiological measurements. We are now about to finalize the analysis of the data. It appears that the data confirm our initial hypothesis. Most importantly, the data also demonstrate marked vascular dysfunction in the systemic circulation. We are expecting to submit an article before the end of the 2009.

Key words:

Hypoxia, pulmonary hypertension, fetal programming, endothelial function, cardiovascular risk, acute mountain sickness

Collaborating partners/networks:

Imperial College Healthcare NHS Trust, St.Mary's Hospital, London, United Kingdom; Department of Biomedical and Surgical Sciences, University of Verona, Verona, Italy; CSEM, Neuchâtel, Switzerland. Neurovascular Research Laboratory, Faculty of Health, Science and Sport, University of Glamorgan, UK

Scientific publications and public outreach 2009:

Refereed journal articles

Bloch J., Duplain H., Rimoldi S.F., Stuber T., Kriemler S., Allemann Y., Sartori C., Scherrer U. Prevalence and time-course of acute mountain sickness in older children and adolescents after rapid ascent to 3'450 m. *Pediatrics* 2009; **123**:1-5.
<http://pediatrics.aappublications.org/contents-by-date.0.dtl>

Conference papers

Stuber T, Rimoldi SF, Lim P, Garcin S, Duplain H, Bloch J, Sartori C, Scherrer U, Allemann Y, Peters N. Autonomic dysregulation in children conceived with assisted reproductive technologies. *J Interv Card Electrophysiol*, 2009; 24:236.

Rimoldi SF, Stuber T, DeMarchi SF, Duplain H, Garcin S, Sartori C, Scherrer U, Allemann Y. Pulmonary artery pressure and right ventricular function in healthy children and adolescents after rapid ascent to 3'450m. *Eur Heart J* 2009; 30 (Abstract Supplement):113.

Rimoldi SF, Stuber T, DeMarchi SF, Garcin S, Duplain H, Germond M, Sartori C, Scherrer U, Allemann Y. Systemic vascular dysfunction in children conceived by assisted reproductive technologies. *Eur Heart J* 2009; 30 (Abstract Supplement):153.

Radio and television

Interview with Prof. Claudio Sartori, High-altitude Medicine Specialist at the Research Station Jungfrauoch, RSR La Première, Emission "Vision Suisse", July 28, 2009.

Interview with Prof. Scherrer, High-altitude Medicine Specialist at the Research Station Jungfrauoch, DRS1, Emission "Vision Suisse", July 28, 2009.

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